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MONTHLY PROGRESS REPORT #4

on the

TERRAIN AVOIDANCE RADAR SYSTEM

For the period from

31 August to 30 September 1957

G.O. AAD-30465

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WESTINGHOUSE ELECTRIC CORPORATION

Air Arm Division

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Baltimore 3, Maryland.

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PROGRESS FOR THE PERIOD FROM 31 AUGUST TO 30 SEPTEMBER 1957

SYSTEM CONSIDERATIONS:

Some doubt exists regarding the aircraft on which the system will be installed. For this reason some details of the correlation of the system with other aircraft facilities cannot be determined. Recent concern over radome frontal area has lead to the consideration of the possibility of eliminating the antenna servo. This servo serves to position the antenna to compensate for drift angle. When banking this requires a correction in two planes. Elimination of this feature decreases the radome dimensions in height and width and eliminates the need for a doppler radar with wind computer and a bank angle signal from a vertical reference. The terrain seen on the indicator will appear to drift to one side at a rate dependent on the drift angle just as the terrain seen through the windshield would appear to drift under visual conditions. This drift rate and direction enables visual determination of the true heading relative to the picture. This being so, the only reason for having a servo is to maintain equal coverage to either side of the aircraft in the presence of a drift angle. If moderate winds are postulated, this is of minor importance.

ANTENNA:

A rolled-up antenna feed horn design was submitted to the model shop. Difficulty was encountered due to the material being too thick to roll. A new design using thinner material has been completed and submitted to the model shop. The high-speed rotary joint was constructed in the model shop. Some difficulty was encountered due to the faulty plating. It was replated and is now ready for test.

TRANSMITTER:

It appears that the MA-207 magnetron will be satisfactory. The manufacturer has found that the cathodes are being contaminated by support material. A new support material will be used to eliminate the trouble. Tubes which have

contaminated cathodes may be recovered by running them with full filament voltage until the foreign material is eliminated and satisfactory operation is restored. A third tube which the manufacturer had treated in this manner was received and has operated satisfactorily for about 25 hours. A constant peak power of 70 KW has been produced during this period. One of the magnetrons we received previously has been reconditioned with this process. It produces 50 KW output. The other magnetron had apparently been damaged beyond repair.

MODULATOR:

The modulator design has been checked out and drafting is now in progress. Transformers have been ordered and a breadboard modulator will be built to check out the transformer designs when they are received. The present breadboard uses a lab power supply and general purpose tapped transformers.

AFC:

Drafting is 95% complete on the AFC and it should be released to the model shop on schedule. A breadboard hookup of the modulator, transmitter, AFC and local oscillator has been checked out.

RECEIVER:

The pre-amplifier breadboard test has been completed, D-spec prepared with schematic diagram and electrical parts list, and drafting has completed the layout design.

The post amplifier breadboard construction and test has been completed minus the STC.

SYNCHRONIZER:

A final breadboard model incorporating latest system philosophies is being constructed.

A complete schematic has been prepared and submitted to drafting.

A components list has been prepared for use by the model shop in advance ordering long lead items.

X-SCOPE:

Electrical design of the "X" Scope is complete. Circuit bench testing will be continued. Schematics of both the indicator unit and sub-chassis have been completed and electrical parts lists are being compiled. All the information to date has been turned over to drafting.

Bausch and Lomb shipped the first optical system during this period.

E-SCOPE:

A complete schematic wiring diagram, and general layout diagram was prepared and submitted to drafting. A component list has been supplied for model shop use to expedite procurement of long lead items.

Drafting has started layout on the horizontal sub-chassis unit.

CONTROL PANEL:

The control panel design has been completed. It is not scheduled for drafting yet and will not be submitted until it is decided whether the antenna servo will be eliminated. If this is done, certain functions of the control panel will be eliminated.

POWER SUPPLY:

A modification to the proposed 300V and 400V supplies was found necessary to eliminate selection of critical components. This will result in three different control types instead of one standard plug-in package for all supplies.

A decision was made to enclose the entire control circuitry for each power supply within an inexpensive but adequate oven. It is felt that this step will avoid loop gain changes with respect to temperature and provide a single

shielded enclosure for the control circuitry.

Filament voltage regulation was also considered necessary based on test data. A simple ballast tube control circuit will be investigated to determine suitability with respect to temperature variations.

ANTENNA SERVO:

Design of the antenna servo is proceeding as scheduled. Until it is decided definitely not to use a servo, work will continue.

FUTURE ACTIVITIES:

During the next month design and breadboard testing will continue. During this time all the remaining units except the antenna and radome will be submitted to drafting. A complete breadboard "X" scope with storage CRT and optical systems should be in operation by the end of the month.

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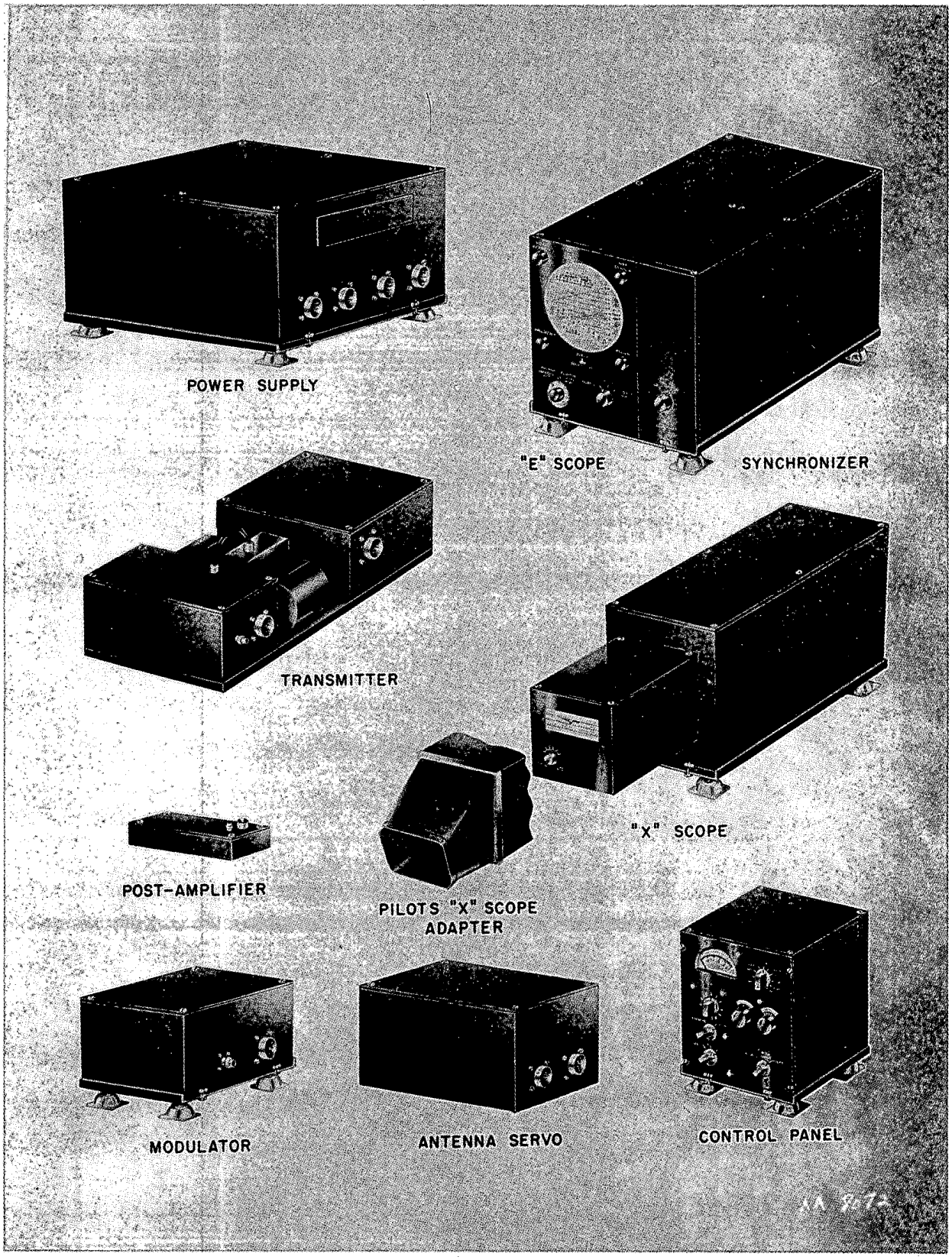

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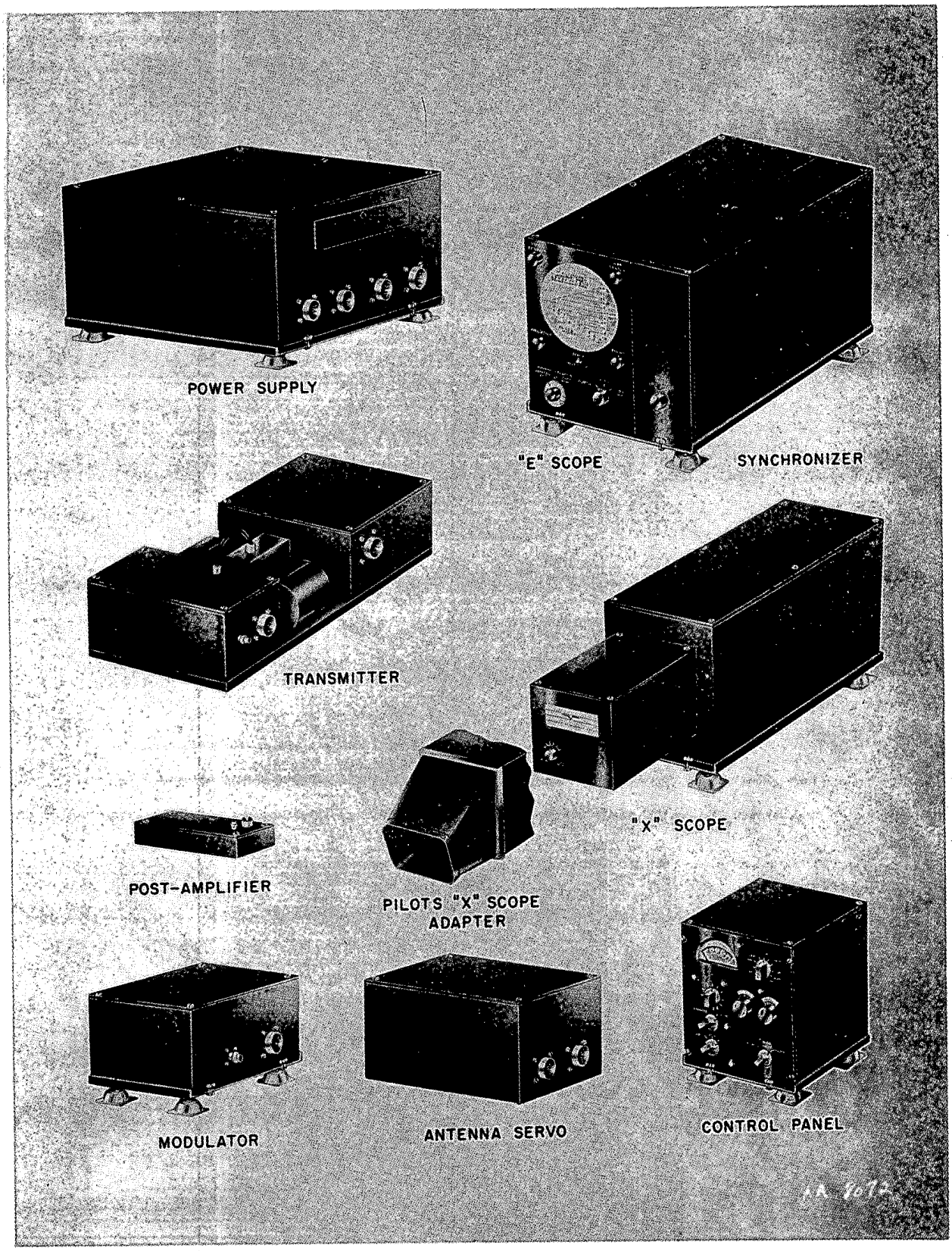

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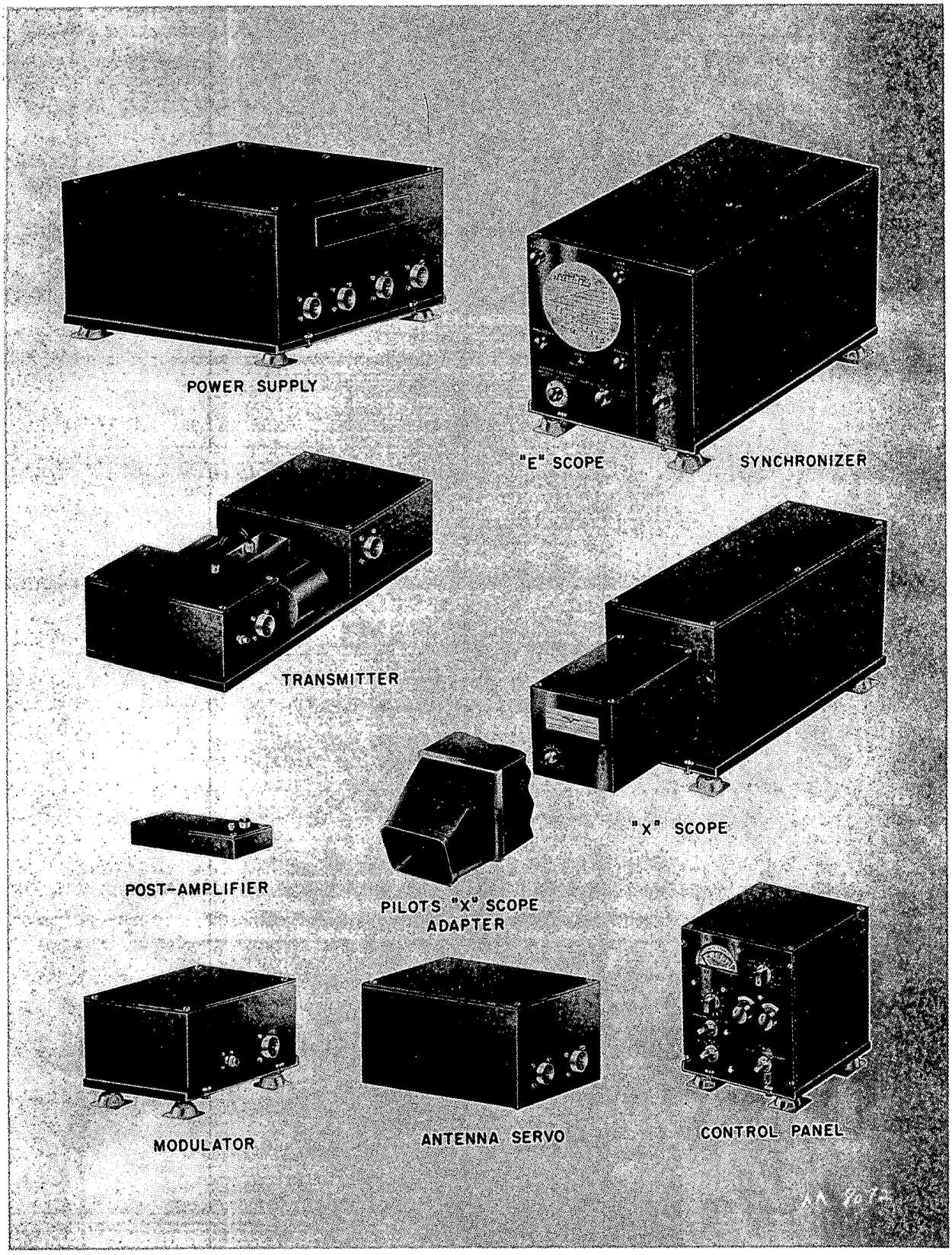

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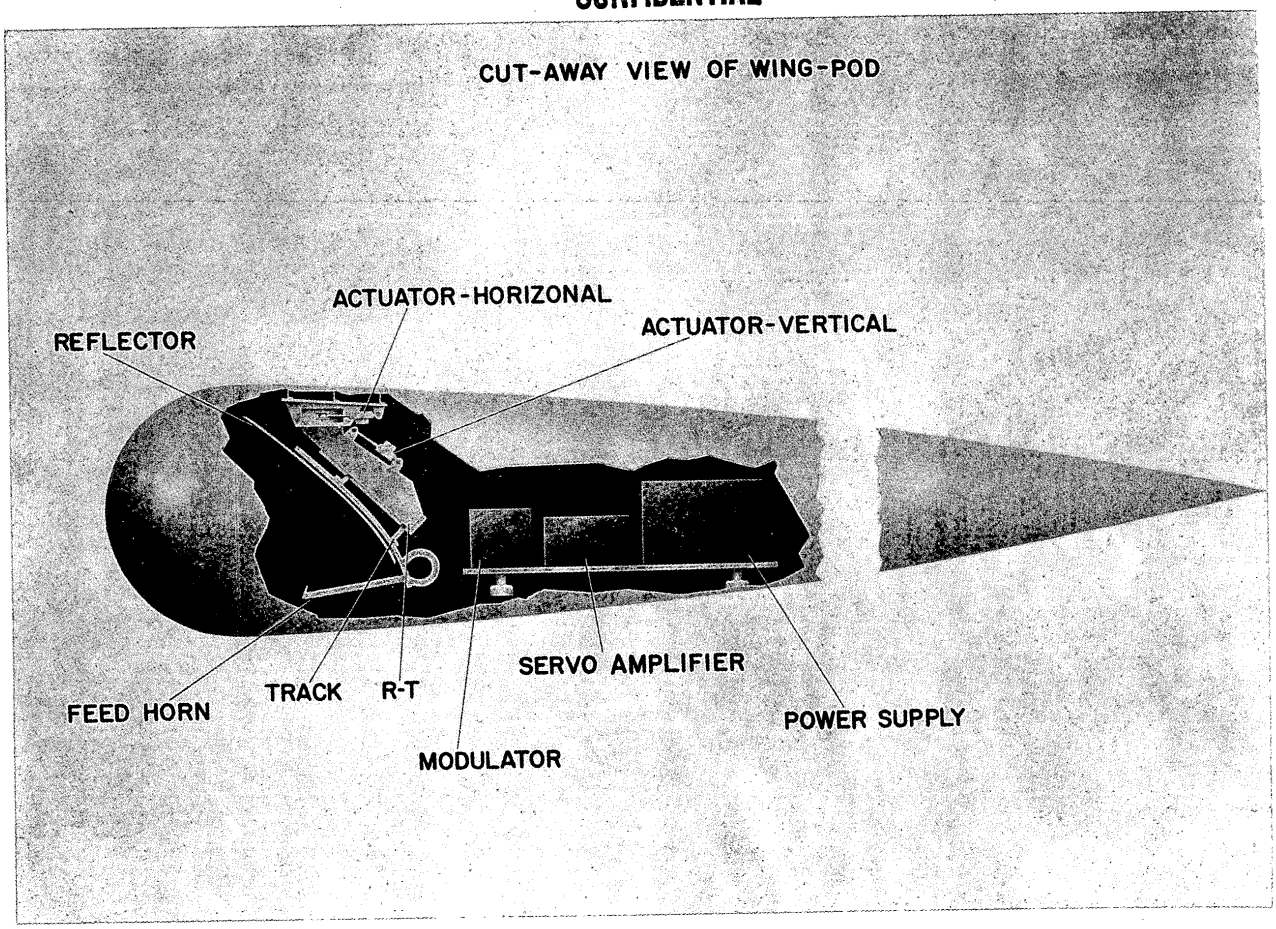

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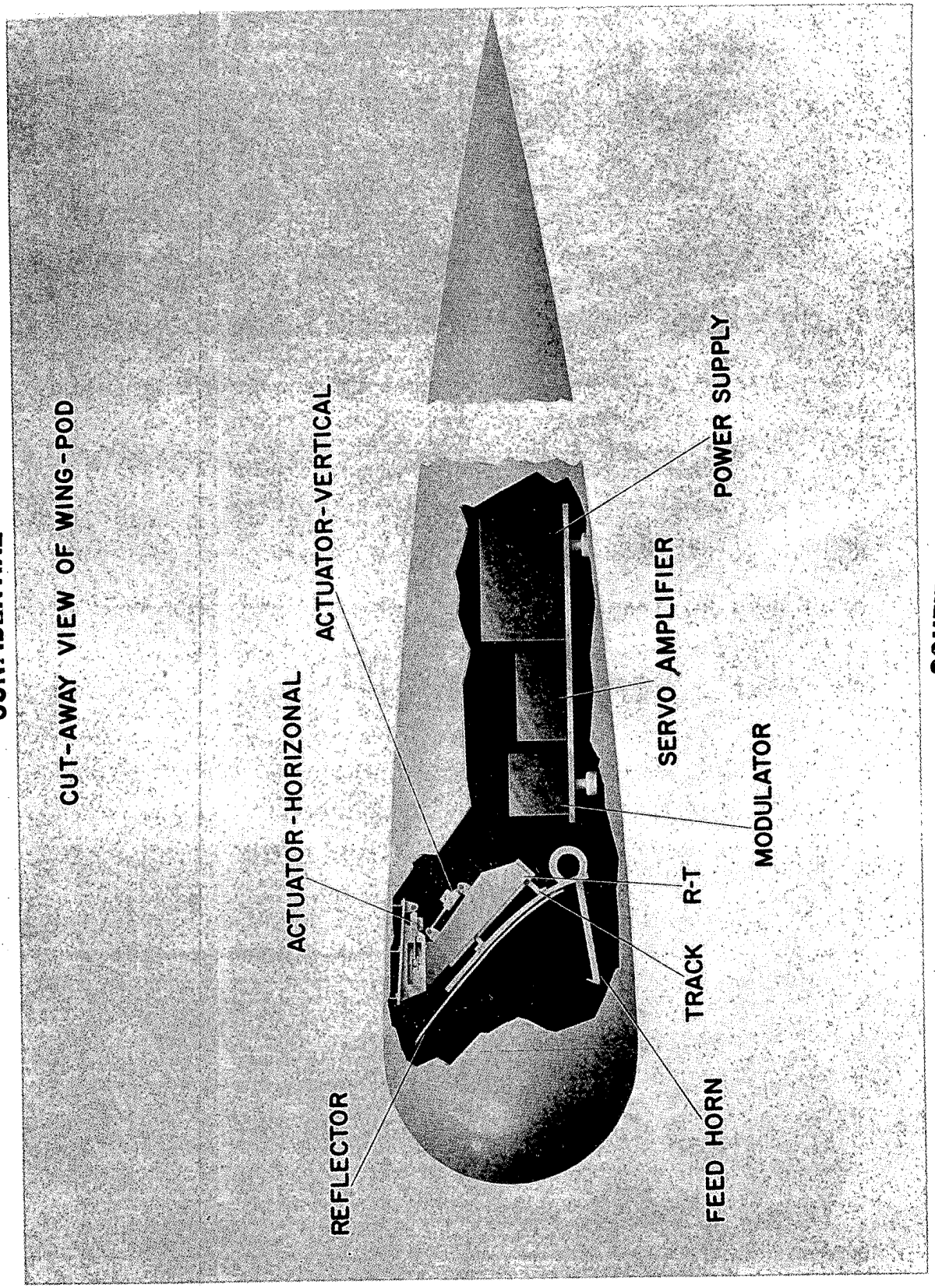
CUT-AWAY VIEW OF WING-POD



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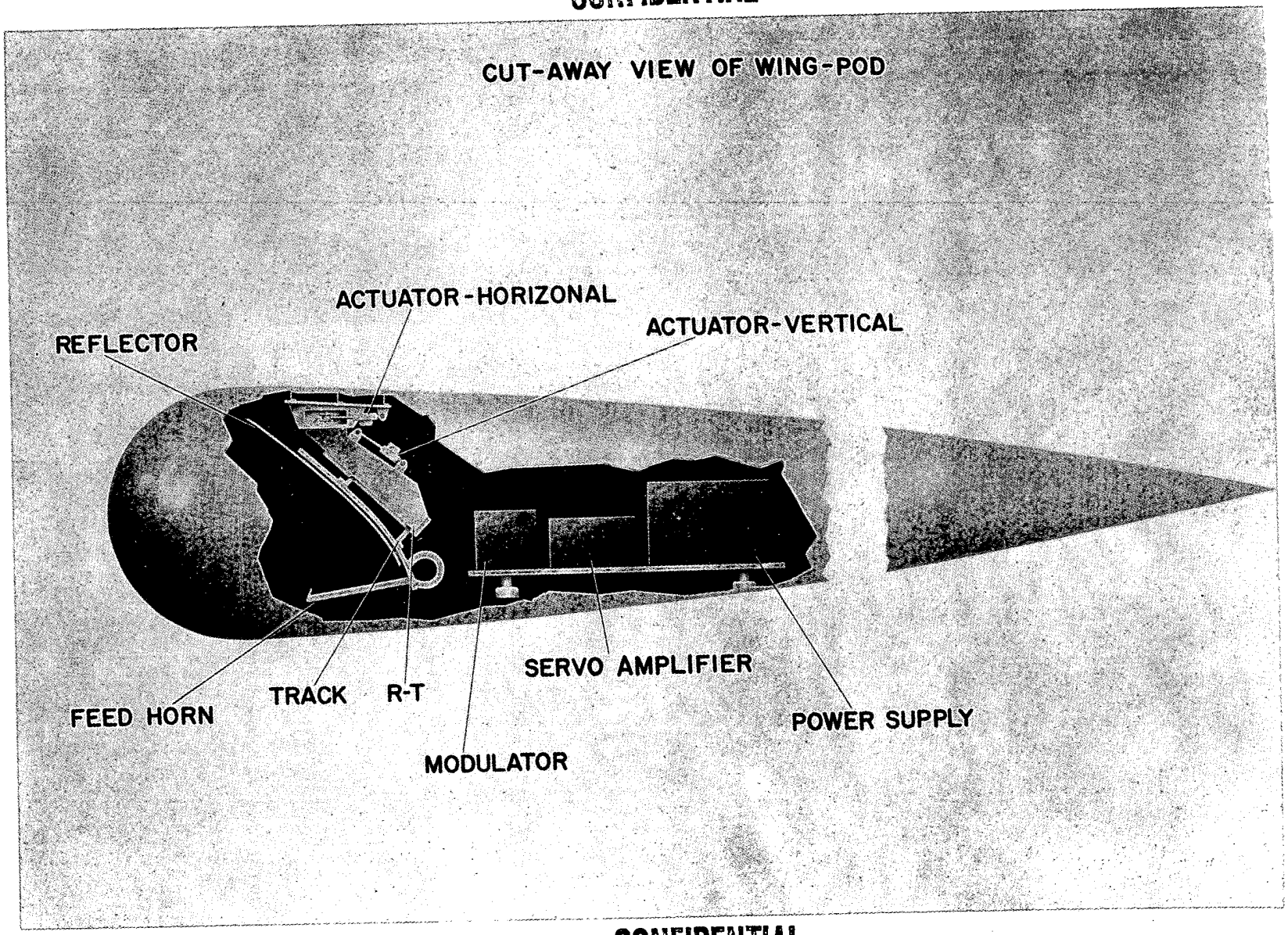

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